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A PROPOSAL TO STUDY THE ENVIRONMENT AROUND THE JACKSONVILLE NAVAL AIR STATION

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The occurrence and magnitude of environmental problems has been increasing rapidly nationwide in the late 1980's. Recent events include massive dolphin kills along the east coast of the United States and the Exxon Valdez oil spill in Alaska.

Of more local concern, in May of 1989 Florida State health officials added the Suwanee River and its tributaries to the list of sites where mercury contamination has made it unsafe to eat large-mouth bass (1). This health advisory was the third issued by the Department of Health and Rehabilitative Services (HRS) since March 1989 when high concentrations of mercury were found in bass caught in the Everglades. In early May 1989 a warning was issued about mercury levels in the Hillsborough River. The HRS is also studying waters in north Florida for contamination.

In 1984 an alarming outbreak of lesions on fish occurred along the east coast of the United States. Three areas of major impact were the North Carolina coast, Chesapeake Bay, and the St. Johns River in Jacksonville. In the fall of 1985, following extensive publicity about the fish disease and water quality problems in the St. Johns River, the Florida Department of Environmental Regulation (FDER) prepared an assessment of the situation (2). The study found the following.

(1) In the lower St. Johns River, especially in Duval County, evidence of critical pollution is mounting and water quality problems are evident.

(2) Rapid urban expansion along the numerous tributaries of the St. Johns River is increasing their pollutant loadings.

(3) An estimated 35% of the discharges from regulated surface water dischargers are in violation of permit criteria.

(4) Elevated concentrations of metals are found in the sediments throughout the Duval County seciton of the lower St. Johns River with a marked enrichment of the metals occurring in the Talleryand industrial area.

(5) No organized effort to correct these problems exists.

Two years later, in March of 1987, the Environmental Protection Board of the City of Jacksonville indicated the lack of water and sediment quality in a Water Quality Attainment Plan (3). The findings included the following:

(1) Widespread violations of ambient water quality criteria such as coliform bacteria, dissolved oxygen, heavy metals and PCB's.

(2) No monitoring to investigate causes of ulcerated fish disease or human risk from chemical contamination of fish flesh.

(3) Fifty percent of the 68 permitted industrial wastewater sources violated standards in the previous 12 months.

(4) Documented violations of Ambient Water Quality Standards exist for iron, copper, mercury, zinc, cadmium, lead, aluminum, silver and chromium.

In the August 1988 Interim Swim Plan for the Lower St. Johns River Basin, put together by the St. Johns River Water Management District (4), they indicated that concentrations of heavy metals and other contaminants are so great in the river that the U.S. Army Corps of Engineers petitioned for a variance of state water quality standards for copper, mercury, PCBs, silver, and oil and

Because the diseased fish have been found to have a diversity of pollutants, it is believed that one source of the toxicants might be possible. The largest generator of hazardous wastes in Northeast Florida is the Naval Air Station (NAS). At the NAS the operations which generate large quantities of hazardous wastes are generally confined to the Naval Air Rework Facility (NARF). Several studies at the NAS by private contractors concluded that several sites on the base posed a threat to human health and the environment. Many of the contaminated sites are close to the river or to ditches and storm drains which discharge into the river (9).

Although most of the hazardous wastes were improperly disposed of prior to 1980, the NAS reports indicated that the drainage of contaminated sites into the river would probably continue for many years. Also, conversations with anonymous sources at NARF have indicated that hazardous wastes from NARF were still being purposefully dumped into drains which led directly to the river as recently as 1987. Also, the approximately one million gallons per day of industrial wastewater discharges into the St. Johns River after passing through a domestic wastewater treatment plant. In 1986 the Environmental Protection Agency (EPA) found that there is a direct discharge of industrial wastewater to the domestic wastewater treatment plant when the industrial plant's capacity is exceeded. In April 1987 the BESD issued a notice to the NAS advising them that the domestic wastewater treatment plant was exceeding the allowable limits for discharge into the river. This included oil, greases, nickel and chromium. In the BESD

report it was stated that apparently the wastewater treatment plant was not working, and had not been working for a number of years.

Discharges from the Industrial Wastewater Treatment Plant are of great concern since there are several NARF areas which discharge into the industrial sewer system. These include the Cleaning and Plating Facility which discharges rinse water from the cyanide, chrom, and acid sumps; the Component Stripping and Cleaning Shop which discharges paint strippers, including methylene chloride, cresylic acid, trichloroethane, butyl acetate and naphtha; the Aircraft Stripping Shop which generates methylene chloride, cresylic acid, cellulose acetate and butyrate thinner as well as chromium, phenol and cyanide.

Whatever the current status of the NAS wastewater treatment plant, past citations indicate that substantial discharges of pollutants through the sewage plants has occurred. It is known that these pollutants build up in sediments due to rapid sedimentation and low flushing rates. We feel that the outfall should be studied in detail by examination of surrounding sediments.

For the past eight years at Jacksonville University we have been involved in a large number of projects involving the environment. One contract study was with the Florida Department of Natural Resources (FDNR) and involved a two year survey of 30 sites along the St. Johns River for hydrocarbons. Another contract study with the (FDNR) in 1987 involved an oil spill at the mouth of the river by a grounded freighter. We have also carried out research projects which have involved analyses of

metals, phosphates, fluorides, pesticides and PCBs in the river.

In the eight years of environmental studies we have trained more than 35 students in environmental research. Several of these students are pursuing careers in environmental areas and two have received advanced degrees in environmental science. Two current senior students are going to pursue Ph.D. degrees in environmental science.

Our goal in this proposal is not just to carry out analyses, but to establish a program to further knowledge of the local environment. Our research thus far has resulted in a number of reports which have been submitted to various agencies for their usage. We have pointed out a number of problem areas of the river which we have studied first-hand and about which we have received reports from concerned citizens.

We have recently collected 24 sediment and water samples from areas around the NAS and are currently carrying out analyses of these samples. Initial studies show very large hydrocarbon levels in most of the sediment samples.

We feel that a thorough study of certain ares around the NAS is warranted. To accomplish our objectives of training students in environmental studies and furthering knowledge of the local environment, and possibly determining the safety of fish from the St. Johns River, for eating, we propose a two-year study of the fish, water and sediment, all collected in areas around the NAS as well as one control area. We intend to limit our study to metals which will include arsenic, aluminum, beryllium, cadmium, chromium, copper, lead, mercury, nickel, selenium, silver, tin and zinc.

After initial studies in the first year on a limited number of sediment samples, we propose to "map" areas with high metal concentrations. Since sediment pollutants can be very localized we would like to determine the pattern of pollution which the complicated tidal flows in the St. Johns River can effect. In the second year we would concentrate on those areas and sample types which gave the most useful information in the first year of the study.

To carry out the objectives we propose to obtain the services of six students for six academic terms over a two year period. We wish to pursue a cooperative effort with Edward Waters College in this endeavor, and we feel that three students from each school working together would benefit all to the greatest extent.

To do the analyses we propose the purchase of an absorption spectrometer with data handling capabilities and the accessories required for the elements we wish to measure. We are also requesting funds for digesters to handle large numbers of fish samples simultaneously as digestion is often a very time-consuming part of a project. We are also requesting funds for the very expensive high-quality solvents and other reagents needed to do trace-metal analysis.

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